

Application No. 10/612,924

IN THE DRAWINGS:

Please amend Figure 1 as illustrated in red on the attached photocopy.

REMARKS

Claim Rejections

Claims 1-6 are rejected under 35 U.S.C. § 112, second paragraph. Claims 1-6 are rejected under 35 U.S.C. § 102(b) as being anticipated by Kojima (U.S. 5,624,336).

Drawings

Applicant proposes to amend Figures 1, as illustrated in red on the attached photocopies. In Figure 1 it is proposed to add the label --prior art--. No "new matter" has been added to the original disclosure by the proposed amendments to these figures. Approval of the proposed drawing changes is respectfully requested.

New Claims

By this Amendment, Applicant has canceled claims 1-6 and has added new claims 7-14 to this application. It is believed that the new claims specifically set forth each element of Applicant's invention in full compliance with 35 U.S.C. § 112, and define subject matter that is patentably distinguishable over the cited prior art.

One of the major objectives of the present invention is found in the Summary of the Invention, page 4, lines 27-32, which reads:

in such a manner that, while said chain guide of the front derailleur is operating in the highest speed mode, said linkage rod is at a position substantially parallel to said seat tube, so that a restoring force provided by said return spring is equal to an active component force for actually shifting said chain, that is, the restoring force can be utilized fully for down-shifting.

The present invention is focused only on the down-shifting operation that is shifting the chain from the highest level (the largest sprocket of the front derailleur) to the medium level.

The cited reference to Kojima teaches a front derailleur having an independent movable chain guide plate used in the derailleur of a bicycle. More specifically, the movable chain guide plate will change its shape to fit the chain positioning at different levels (sprockets) of shifting.

In the present invention, when the chain is located at the highest level (the largest sprocket of the front derailleur), the return spring (52) (see Figs. 6 and 7) is fully coiled and has its maximum returning force. Utilizing this maximum returning force efficiently to pull down the chain from the highest level (the largest sprocket of the front derailleur) to a medium level is the major inventive step of the present invention.

Please refer to Figs. 8 to 11 of the present invention, when the chain guide (3) of the linkage mechanism is located in highest speed mode, the chain engaging the largest sprocket, and the linkage rod (4) is at a position parallel to the seat tube (A1) (this is the major feature of the structure of the present invention). Therefore, when an imaginary vertical line (V) is located at an end of pivoting range the restoring force (FsH) of the return spring (52) is equal to the active component force (FcH) for actually shifting the chain (C), that is, the restoring force is utilized fully for down-shifting. When the chain guide pivots from the highest speed position through an angle " ϕ_1 " to the intermediate position, as shown in Fig. 9, the chain guide (3) receives a restoring force (FsM) from the return spring reducing the active component force (FcM) and is thereby utilized for down-shifting. When the chain guide pivots from the intermediate speed position through an angle ($\phi_2 - \phi_1$) to a low position, as shown in Fig. 10, the chain guide (3) receives a restoring force (FsL) from the return spring against the active component force (FcL) and is thereby utilized for down-shifting. Further, in Fig. 11, because the return spring undergoes a varying elastic deformation with the pivotal movement of the chain guide, the restoring force (FsM) in the intermediate position becomes greater than the restoring force (FsL) in the low speed position, and the restoring force (FsH) in the high position becomes greater than the restoring force (FsM) in the intermediate position. It becomes clear from Fig. 11 that $FcH = FsH$, $FcM = FsM \cdot \cos \phi_1$, and $FcL = FsL \cdot \cos \phi_2$.

Moreover, as seen in Fig. 12, the moving track (T1) of the chain guide (3) according to the present invention is an upward continuous arc, unlike the moving track (T2) of the prior art. The moving track (T1) enables the chain guide (3) to be more adjacent to the larger sprocket of the chain-wheel (B1). Besides, the present invention can utilize a return spring having less strength since the restoring force is

fully utilized for down-shifting from the high speed mode, when comparing to Kojima, so that less force will be needed for up-shifting. Consequently, the up-shifting efficiency is be improved.

As illustrated in Fig. 13 of the present Application, by making $L1 = 39\text{mm}$, $L2 = 53\text{mm}$ (which is the same as the U.S. pat. Nos. 5,496,222 and 5,620,384), and $B = 21\text{mm}$, thus ϕ_2 is about equal to 41.81 degrees, that is

$$53 - 39 = 14$$

$$21 * \sin \phi_2 = 14$$

$$\phi_2 = \sin^{-1}(14/21)$$

If the length of B is 16mm, then ϕ_2 is about equal to 61.05 degrees. If the length of B is 14mm, then ϕ_2 is about equal to 90 degrees. Therefore, in actual practice, the length B shall be larger than $L2-L1$. In fact, the length of B is different in different manufacturer according to different specification.

Kojima does not teach when the chain guide is in the highest speed mode, the linkage rod is located at a position substantially parallel with the seat tube and the restoring force of the return spring is equal to an active component force required for shifting the chain, such that the restoring force is utilized for down-shifting.

It is axiomatic in U.S. patent law that, in order for a reference to anticipate a claimed structure, it must clearly disclose each and every feature of the claimed structure. Applicant submits that it is abundantly clear, as discussed above, that Kojima does not disclose each and every feature of Applicant's new claims and, therefore, could not possibly anticipate these claims under 35 U.S.C. § 102. Absent a specific showing of these features, Kojima cannot be said to anticipate any of Applicant's new claims under 35 U.S.C. § 102.

It is further submitted that Kojima does not disclose, or suggest any modification of the specifically disclosed structures that would lead one having ordinary skill in the art to arrive at Applicant's claimed structure. Thus, it is not believed that Kojima renders obvious any of Applicant's new claims under 35 U.S.C. § 103.

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Summary

In view of the foregoing amendments and remarks, Applicant submits that this application is now in condition for allowance and such action is respectfully requested. Should any points remain in issue, which the Examiner feels could best be resolved by either a personal or a telephone interview, it is urged that Applicant's local attorney be contacted at the exchange listed below.

Respectfully submitted,

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By:



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